The Rocket Blog

A blog about anything related to rockets and space technology from news to how to make your own propellant.

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Preparing the electrolyte for the process

Preparing fresh electrolyte

First, prepare a saturated solution of sodium chloride. Take about 40 grams for every 100 ml of solution and bring the solution to a boil. Then allow to cool to room temperature again. Some sodium chloride will crystallize as the solution cools. The solution is then filtered to obtain a clear saturated solution.

Optionally, 2 to 4 g/l of potassium dichromate, potassium chromate, sodium chromate or sodium dichromate may be added to improve efficiency. These compounds are suspected carcinogens, so if you choose to add any, know the hazards involved and act accordingly. If lead dioxide anodes are used, do not add potassium dichromate as it will only reduce efficiency. Instead, 2 to 4 g/l of sodium or potassium fluoride may be used. Although not carcinogenic, the fluorides are nasty compounds as well and should be handled properly.

Finally, the pH of the solution can be adjusted. A pH of around 6 is optimal, but anything between 5.5 and 6.5 is reasonable. The pH can be increased by addition of sodium hydroxide solution and it can be decreased by adding hydrochloric acid. Do not use too concentrated solutions for adjusting the pH. A concentration of 2% (w/v) for both solutions is convenient to work with.

Recycling old electrolyte

When electrolyte from a previous batch of perchlorate is available the following steps can be used to recycle the electrolyte.

If the electrolyte is not clear but has solid particles in it, filter to remove these and dissolve any impure chlorate from the purification and extraction steps.
After, re-saturate the solution with sodium chloride. The procedure mentioned above in step 1 of 'preparing a fresh electrolyte' may be used.
The chromate, dichromate or fluoride if added is still present so does not need to be replenished.
The pH should be readjusted, like in step 3 for preparing a fresh solution above.

Or you can prepare a saturated solution of sodium chlorate if you have access to it. Take about 60 grams of sodium chlorate for every 100 ml of solution and bring the solution to a boil. Then allow to cool to room temperature again. Sodium chlorate will crystallize as the solution cools. The solution is then filtered to obtain a clear saturated solution.

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